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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/706,323

11/12/2003

Takehisa Higa

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11/02/2005

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EXAMINER

DICHT, RACHEL S

ART UNIT

PAPER NUMBER

2853

DATE MAILED: 11/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/706,323

Applicant(s)

HIGA ET AL.

Examiner

Rachel Dicht

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) 6-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 24 February 2004.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. Figures 7, 8, 9 and 10 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata et al. (US Pat. No. 6,109,738) in view of Yamauchi et al. (US Pat. No. 6,568,797).

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In regard to:

Claim 1:

Miyata et al. teaches an ink jet recording head structure comprising: an inkjet recording head comprising a flow passage member (10, Fig. 2b) provided with a plurality of ink chambers (12, Fig. 2b) and pressurizing mechanisms (60, 70, and 80, Fig. 2b) for pressurizing ink in respective ink chambers, and a nozzle plate having ink discharge holes (11, Fig. 2b) communicating with said ink chambers; and a support member (20, Fig. 2b) comprising ceramics that has ink delivery holes communicating with the ink chambers of said flow passage member and supports said inkjet recording head, wherein said ink delivery hole has the elongated hole (31, Fig. 2b) having the inclined bottom surface (edges of ink chamber 12, Fig. 2b) that opens on the ink jet recording head side and deepens toward the center, and a small-diameter hole (21, Fig. 2b) that communicates with said elongated hole.

It is noted, however, that Miyata et al. fails to teach an ink jet recording head structure comprising a surface roughness of at least the inclined bottom surface of said ink delivery hole is from 0.4 to 1.0  $\mu\text{m}$  in terms of arithmetic mean roughness (Ra) and void ratio is in a range from 5 to 30%.

However, Yamauchi et al. teaches an ink jet recording head structure comprising a surface roughness of at least the inclined bottom surface of said ink

delivery hole is from 0.4 to 1.0  $\mu\text{m}$  in terms of arithmetic mean roughness (Ra) (refer to column 9 lines 43-48 and column 11 lines 46-50).

Miyata et al. in view of Yamauchi et al. discloses the claimed invention except for the void ratio of 5 to 30%. It would have been obvious to one having ordinary skill in the art at the time the invention was made to include a void ratio in the specified range, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use for the purpose of allowing ink to flow freely and not clog nozzles or chambers. *In re Leshin*, 125USPQ 416.

Claim 2:

Miyata et al. teaches an ink jet recording head structure wherein said inclined bottom surface is the surface as sintered (refer to column 1 lines 40-45).

Claim 4:

Miyata et al. teaches an ink jet printer that employs the ink jet recording head structure (1A and 1B, Fig. 17).

Claim 5:

Miyata et al. teaches an ink jet printer comprising the ink jet recording head structure, paper feeding means for supplying printing medium (S, Fig. 17)

to the inkjet recording head structure, and paper discharging means for discharging the printing medium that has been printed by the ink jet recording head structure (1A and 1B, Fig. 17) (refer to column 19 lines 23-39).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Miyata et al. to include the specified roughness as taught by Yamauchi et al. for the purpose of preventing the driving force of the piezoelectric ceramics from being lowered.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyata et al. (US Pat. No. 6,109,738) in view of Yamauchi et al. (US Pat. No. 6,568,797) as applied to claim 1 above, and further in view of Chung et al. (US Pub. No. 2003/0112300 A1).

The device of Miyata et al. as modified by Yamauchi et al. DIFFERS from claim 3 in that it fails to teach an ink jet recording head structure wherein said inclined bottom surface is subjected to an annealing treatment.

However, Chung et al. teaches an ink jet recording head structure wherein said inclined bottom surface is subjected to an annealing treatment (refer to paragraph [0135]).

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Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Miyata et al. as modified by Yamauchi et al. to subject the bottom surface to an annealing treatment as taught by Chung et al. for the purpose of forming an protective layer.

***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rachel Dicht whose telephone number is 571-272-8544. The examiner can normally be reached on 7:00 am - 3:30 pm Monday through Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571-272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RSD



October 21, 2005



**MANISH S. SHAH**  
**PRIMARY EXAMINER**